

## **CLAIMS**

What is claimed is:

1. A method of forming a semiconductor structure comprising:  
forming a transistor structure in an active area of a semiconductor substrate, said transistor structure including a gate on said substrate, said gate having a top surface and opposing side surfaces, first dielectric spacer portions adjacent said top surface and said opposing side surfaces, and diffusion regions in said substrate adjacent said gate; and  
depositing a thermally conducting non-electrical conducting material over said transistor structure.
2. The method of claim 1, further comprising the step of patterning a contact to at least one of said diffusion regions.
3. The method of claim of claim 2, wherein said patterned contact has a top surface and a plurality of exposed side surfaces, and wherein after the step of patterning said contact to one of said diffusion regions, the method further comprises forming a second spacer portion of dielectric material adjacent to at least one of said exposed side portions of said contact.
4. The method of claim 3, further comprising the step of depositing a thermally conducting material over said top surface of said contact.
5. The method of claim 1, wherein said thermally conducting non-electrical conducting material is selected from the group consisting of AlN, BN, SiC, polysilicon, and CVD diamond.
6. A method of forming a semiconductor structure comprising:  
forming a transistor structure in an active area of a semiconductor substrate, said transistor structure including a gate on said substrate, said gate having a top surface and opposing side surfaces, dielectric spacer portions adjacent said top surface and said opposing side surfaces, diffusion regions in said substrate adjacent said gate, and a metal contact to at least one of said diffusion regions; and

depositing a thermally conducting non-electrical conducting material over said transistor structure.

7. The method of claim 6, wherein said dielectric spacer portions are first dielectric spacer portions and wherein said metal contact has a top surface and a plurality of exposed side surfaces, said method further comprising forming a second spacer portion of dielectric material adjacent to at least one of said exposed side portions of said contact.

8. The method of claim 6, wherein said thermally conducting non-electrical conducting material is selected from the group consisting of AlN, BN, SiC, polysilicon, and CVD diamond.